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10/596,619	06/19/2006	Johan Nystrom	P18772US1	8482

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EXAMINER	
JAMA, ISAAK R	
ART UNIT	PAPER NUMBER
2617	

NOTIFICATION DATE	DELIVERY MODE
10/28/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/596,619	NYSTROM ET AL.	
	Examiner	Art Unit	
	ISAAK R. JAMA	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-75* is/are pending in the application.

4a) Of the above claim(s) *1-32* is/are withdrawn from consideration.

5)☒ Claim(s) *65* is/are allowed.

6)☐ Claim(s) *33-50, 52-64 and 66-75* is/are rejected.

7)☒ Claim(s) *51* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 33-73 are pending

2. Claims 33, 52 and 60 are amended.

3. Claims 66-73 are newly added.

Response to Arguments

1. Applicant's arguments with respect to claims 33-64 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 33, 50, 52, 55, 57, 60, 63, 66-69 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 7,184,703 (Naden et al.) in view of U.S. Patent Number 7,085,314 (Zhu et al.) further in view of U.S. Patent Application Publication 2003/0182617 (Kanoaka et al.), and further in view of U.S. Patent Application Publication 2005/0048914 (Sartori et al.).

4. Regarding claims 33, 50, 52, 55, 57, 60 and 63, Naden teaches a wireless relay based network, comprising: a first node **[Figure 4, # 2, source]**; at least one relay station **[Figure 4, #s 12, 14 and 16, Relays 1, 2 and 3]**; and a second node **[Figure 4, # 4, destination]**; wherein said first node communicates with said second node via said

at least one relay station **[Column 2, lines 44-46]**, wherein each relay station is operative to: receive a digital communication from said first node **[Column 2, lines 36-42]**; and Zhu teaches a method and apparatus for reducing signal degradation in a received signal **[Title]**, whereby a method of modifying the values of a plurality of digital filter coefficients for use by a digital filter which is a component of a relay station, the relay station successively receiving a first signal, modifying the first signal using the digital filter to form a second signal, and transmitting the second signal with amplification **[Column 2, lines 36-42]**. Kanoaka as discussed in earlier action teaches a data processing apparatus using iterative coding **[Title]**, whereby decoder that corresponds to the turbo encoder of the writing system performs a posteriori probability decoding (APP). Specifically, a log likelihood ratio $L^n(u^*)$ expressed by an a posteriori probability concerning data bits (a probability of uk being 1, and a probability of uk being 0) and a log likelihood radio $L^n(p^*)$ expressed by an a posteriori probability concerning parity bits (a probability of pk being 1, and a probability of pk being 0) are calculated based on the prior information L(uk) that is the likelihood information about the data bits and the prior information L(pk) that is the likelihood information about the parity bits, respectively **[Pages 4 and 5, paragraph 0077]**. What Naden, Zhu and Kanoaka do not specifically teach is that the pluralities of digital symbols are the same in the received digital communication. Sartori in an analogous art teaches a method and apparatus for relay facilitated communication **[Title]**, whereby When the relay resource has the ability to decode the received information from the transmitter, another potential alternative embodiment includes providing the relay resource with an ability to assess the accuracy

or completeness of the received information and to make follow-on decisions or actions. For example, such a relay resource can therefore be configured to: demodulate and decode the transmission from the transmitter to provide

5. decoded information; determine whether the transmission has been likely correctly received; re-encode the decoded information to provide re-encoded information; transmit the re-encoded information to the base site when the transmission appears to have been correctly received **[Page 4, paragraphs 0045-0049]**.Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the decoding and encoding method of Sartori's relay into the combined system of Naden, Zhu and Kanoaka in order to accurately deliver the original data.

6. Regarding claim 50, Naden further teaches that when one relay station transmits multiple digital communications at different times then said second node combines the transmitted digital communications **[Figure 2, column 11, lines 5-20]**.

7. Regarding claim 57, Naden further teaches that the relay station is used in a wireless multi-hop network **[Column 2, lines 28-32]**.

8. Claims 34, 36, 37, 53, 54, 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naden et al., Zhu et al, Kanoaka and further in view of U.S. Patent Number 7,236,591 (Sim).

9. Regarding claims 34, 54 and 62 Naden, Zhu and Kanoaka teach the limitations of claims 33, 52 and 60 above. But Naden and Zhu fail to teach is the use of a maximum a posteriori (MAP) filter that computes reliability values for code symbols

based on a code structure of the received digital communication. Sim teaches a method for performing turbo decoding in mobile communication systems whereby in order that the input code words iteratively pass through two convolutional decoders, the two convolutional decoders should have output values corresponding to soft decision values having a probability rate of "0" or "1," not hard decision values such as "0" or "1." To obtain such soft decision values, a Maximum a Posteriori (MAP) decoding method is used, in which a posteriori probability value of a data bit is calculated and the data bit is decoded to obtain the maximum posteriori probability value **[Column 1, lines 32-40]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of Sim into the combined system of Naden, Zhu and Kanoaka in order to measure the likelihood that the received bit a soft bit, i.e. a 0 or 1.

10. Regarding claim 36, Naden, Zhu and Kanoaka teach the limitations of claim 33, above. But Naden and Zhu fail to teach that each relay station performs the computing operation using a soft output channel decoder that computes reliability values for information symbols based on a code structure of the received digital communication. Sim teaches that in order to obtain soft decision values, a Maximum a Posteriori (MAP) decoding method has been suggested, in which a posteriori probability value of a data bit is calculated and the data bit is decoded **[Column 1, lines 36-38]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of Sim into the combined system of Naden and Zhu and Kanoaka in order to obtain the maximum posteriori probability value.

11. Regarding claims 37, 53 and 61, Naden, Zhu and Kanoaka teach the limitations of claim 36, 52 and 60 above. But Naden and Zhu fail to teach a soft output channel decoder employs: a maximum a posteriori (MAP) algorithm; a soft output Viterbi algorithm (SOVA); a Log-MAP algorithm; or, a Max-LOG-MAP algorithm. Sim teaches that the primary decoding and the secondary decoding are iterated for a certain number of times using a Maximum a Posteriori (MAP) algorithm, so as to reduce the receiving error rate **[Column 3, lines 24-27].** Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of Sim into the combined system of Naden, Zhu and Kanoaka in order to obtain the logarithm of the ratio of the a posteriori probability of each bit.

12. Regarding claim 35, Naden further teaches that each MAP filter also filters the received digital communication and redistributes noise to unreliable parts in the transmitted digital communication **[Column 3, lines 21-26; Naden discloses that the relay equipment selects from the plurality of signals they receive from source equipments those which are of the highest quality in terms of (SINR), (CINR) or RSS to relay to destination equipments thereby minimizing noise amplification]**.

13. Claims 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naden et al., Zhu et al. and Kanoaka and further in view of U.S. Patent Number 5,115,224 (Kostusiak et al.).

14. Regarding claims 38-43, Naden, Zhu and Kanoaka teach the limitations of claim 33, above. But Naden and Zhu fail to teach that the computed reliability values are embedded in the transmitted digital communication. Kostusiak teaches a personal

security system network whereby each receiving transceiver will transmit a relay signal, which combines (i.e. embeds) the emergency signal with additional received-signal-strength indication (RSSI) information **[Column 3, lines 37-39]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of Kostusiak into the combined system of Naden, Zhu and Kanoaka in order to ascertain how far the transmitting unit is from the receiving unit.

15. Claims 44-49, 58 and 59 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Naden, Zhu, and Kanoaka and further in view of the Applicant's admitted prior arts.

16. Regarding claims 44-49, Naden, Zhu and Kanoaka teach the limitations of claim 33, above. But Naden and Zhu fail to teach that first node is: a base station; a mobile station; or, a relay station; second node is: a base station; a mobile station; or, a relay station; each relay station is: a base station; a mobile station; or, a stand alone relay station; that the received digital communication is: an uplink received digital communication; a downlink received digital communication; a base station peer-to-peer received digital communication; or, a mobile station peer-to-peer received digital communication, and that the transmitted digital communication is: an uplink transmitted digital communication; a downlink transmitted digital communication; a base station peer-to-peer transmitted digital communication; or, a mobile station peer-to-peer transmitted digital communication. Applicant's admitted prior art discloses that relay based networks include one station (node A) that transmits information in coded and modulated digital communications to another station (node B) via one or more relay

stations (RSs). The relay station can be part of a base station (BS), a mobile station (MS) or a stand-alone relay station. The nodes A and B can be a BS, a MS and/or a relay station. And, the digital communications could be either uplink communications (link from MS to BS), downlink communications (link from BS to MS), MS to MS communications or BS to BS communications **[Page 1, paragraph 0004]**. and in regard to claim 49, the Applicant's admitted prior art teaches that when multiple relay stations each transmit the digital communication then said second node combines the transmitted digital communications **[Figure 5; #s 506 (a) and (b) and 504, pages 1 &2, paragraph 0009]**. In addition, and in regard to claim 58, the Applicant's admitted prior art teaches that the second link generally has a larger bandwidth and uses a different air interface protocol than the first link **[Page 1, paragraph 0008]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the relay based networks include one station that communicates with another via a relay that may be a mobile, a base station or an stand-alone repeater, and to have the receiving node combine multiple relay signals. And that the bandwidth allotted between the relay and the destination node is greater than the bandwidth between the transmitting node and the relay in order to accommodate any additional information that may be required by the receiving node.

17. Claims 56, 64 and 70-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naden, Zhu, Kanoaka and Sartori, and further in view of U.S. Patent Number 7,130,601 (Khorram).

18. Regarding claims 56, 64 and 70-75, Naden, Zhu and Kanoaka teach the limitations of claims 33, 52, 60 and 69 above. But Naden and Zhu fail to teach that the computed reliability values are implicitly embedded in the coded/modulated digital communication transmitted to the second node. Khorram discloses a method for determining received signal strength in a direct conversion receiver whereby the RSSI value (reliability value) includes the amplitude modulation **[Figures 4-7, Column 6, 63-65]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of Khorram into the combined system of Naden, Zhu, Kanoaka and Sartori in order to transmit a more robust signal to the receiving node.

Allowable Subject Matter

19. Claim 51 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

20. Claim 65 is allowed.

21. The prior art made of record and relied upon by the Examiner in the prosecution of this Application fails to teach or even suggest "when one relay station knows a channel response of a link between that relay station and said second node then that relay station is able to construct a transmitted digital communication which is coherently combined at said second node with a similar transmitted digital communication received from another relay station" which is recited in claims 51 and 65.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ISAAK R. JAMA whose telephone number is (571)270-5887. The examiner can normally be reached on Monday-Thursday; 4-10.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester G. Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/IRJ/

/LESTER KINCAID/

Supervisory Patent Examiner, Art Unit 2617